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The Philadelphia Press computes that the capitalization of all the trusts organized in this country in the last fifteen months reaches the enormous total of $4,185,000,000. In other words this is two-thirds as large as the cost of the Civil War, and is one-third greater than the greatest debt the United States ever owed. The manufacturers of the country in 1890 had a total capital of $6,139,397,385. The trusts only include a small share of the total manufactures, yet their capital is now two-thirds as large as the total sum invested in all establishments making anything in all the land, and more trusts are being organized daily.

Some idea of the difficulty of communicating with Samoa is to be had from an inspection of ocean distances. From San Francisco to Honolulu the distance is 2100 miles; from Honolulu to Samoa, 2250 miles; from San Francisco to Samoa by direct route, 4160; from Samoa to Auckland, New Zealand, the nearest telegraph station, it is 1580. Under present conditions as much or more time is required for a voyage from San Francisco to Honolulu or from the latter place to Samoa than for a trip to Europe, though the distance from New York to Liverpool is about 3000 miles. When the Pacific cable is laid, it will be tapped for connection with Samoa.

An English woman, Mrs. Rogers, stewardess of the steamer Stella, has won for herself a name and place among the world's heroes and martyrs. When the boat went on the rocks in the English Channel and was fast sinking, she first coolly and courageously assisted the women passengers to put on life preservers and having helped them into the boats, she refused to follow them for fear of overcrowding the already dangerously laden craft. And so, remaining with the steamer, she sunk when the latter broke up and was never seen again. The memorial which the English people are going to erect to her memory will be one in which America would be honored by being asked to join.

Finland, since it was torn from Sweden in 1809 by Russia, has been a Russian principality, enjoying a large measure of home rule. The Czar, under the title of Grand Duke, is their Prince, and they have been his most progressive, enlightened and valuable subjects. They have made their own laws in their Diet and have obeyed them. They have had popular government based on a suffrage nearly universal, and have made great strides forward in wealth, education and civilization, until to-day through their own efforts, they compare favorably in general well being, prosperity and happiness with any people on the continent. Of the Russians, eighty-seven per cent. are illiterates, against one per cent. for the Finns. They have furnished an admirable example of industrial, social and political capacity, and their impending fate has excited the sympathy of the civilized world and horrified the Finnish people.

Russian Newspapers.

There has never existed a political press in the real acceptance of the term in Russia. According to immemorial tradition, the government of the czar only allows the publication of news which is in every respect agreeable to its own views and opinions. In certain special cases of great importance, when it is thought necessary either to excite or to calm public opinion, the Russian government is a trifle more lenient. Thus, for instance, in 1812, during the wars against Napoleon I., two newspapers suddenly made their appearance, and at once became the recognized organs of the Russian Chauvinist party, the Russian Invalid, mouthpiece of the ministry of war and the Syn Otetschesva. The first Russian newspaper dates from the reign of the Czar Alexis (1643-1676). It was known under the name of Current News and was only destined for the immediate "entourage" of the emperor. The real founder of the Russian press was Peter the Great, who first started the St. Petersburg Gazette, the official organ of the Academy of Sciences, a complete collection of which exists since 1714.—Correspondence Providence Journal.

THE WORLD-SMITHS.

What is this iron music
Whose strains are borne afar?
The hammers of the world-smiths
Are beating out a star.
They build our old world over,
Anew its mold is wrought,
They shape the plastic planet
To models of their thought,
This is the iron music
Whose strains are borne afar;
The hammers of the world-smiths
Are beating out a star.

We hear the whirling sawmill
Within the forest deep;
The wilderness is clipped like wool,
The hills are sheared like sheep,
Down through the fetid fenways
We hear the road machine:
The tangled swamps are tonsured,
The marshes combed and clean.
We see the sprouting cities
Loom o'er the prairie's rim,
And through the inland hilltops
The ocean navies swim.

Across the trellised land-ways
The lifted steamers slide;
Dry shod beneath the rivers
The iron stallions glide;
Beneath the tunneled city
The lightning chariots flock.
And back and forth their freight of men
Shoot like a shuttlecock.
The moon-led tides are driven back,
Their waves no more are free,
And islands rise from out the main
And cities from the sea.

We see the mountain river
From out its channel torn
And wedded to the desert
That Plenty may be born;
We see the iron roadway
Replace the teamer's rut;
We see the painted village
Grow round the woodman's hut.
Beneath the baffled oceans
The lightning couriers flee;
Across the sundering isthmuses
Is mingled sea with sea.

Smiths of the star unfinished,
This is the work for you,
The hammer down the uneven world—
And there is much to do.
Scoop down the beetling mountain,
And raze that bulging cape;
The world is on your anvil,
Now smite it into shape.
What is this iron music,
Whose strains are borne afar?
The hammers of the world-smiths
Are beating out a star.
—Sam Walter Foss, in Songs of War and Peace.

THE BURNING OF DIXON'S

IT was evident that Dixon must have informed on them. The Government detective could never have found their well-hidden centre of operations without the aid of one in the secret of the mountain paths and the case so cunningly hidden away. They had always distrusted Dixon. He was not a mountaineer born, but had come among them several years before, had married a mountain girl and entered into their moonshining industry with a zeal that should have left nothing to be desired. But in spite of all this the traces of suspicion still lurked about him, and more than one of the distillers denounced in strong terms the impulse that had prompted them to let him into their confidence.

Now their worst fears had been realized. The still had been raided, the men caught at work were taken away prisoners, and the fortunate few who were elsewhere at the time of the raid were left to stare blankly at the ruins and then to look into each other's eyes and swear vengeance on the informer.

The punishment was decided upon instantly, without a minute's hesitation or a dissenting voice; the only thing that remained for them to do was the drawing of the lots to decide who should apply the torch to the little cabin where Dixon and his family were sleeping soundly, all unconscious of the awful fate that every moment brought nearer.

As they stepped forward one by one to draw the lots the character and thoughts of each might almost be read in his face and action. One might well shrink from the pitiless sternness that showed in the faces of the majority. Here and there was one who looked relieved when he found that he had drawn a blank, but one man stamped his foot and swore with rage when he saw that he had drawn a blank and that the job had not fallen to his share.

At length someone said: "Now, Hawkins, it's your turn. Take your pull," and in obedience to the summons a tall, shambling figure rose from the darkness of the outer circle.

As he stretched out his long bony hand to take his turn a fit of coughing seized him, and when it passed it left him trembling with weakness. He drew the lot quickly, as if fearful that he would lose his turn, and sank weakly down on an upturned keg without looking at his draw.

"Let's see it, Hawkins," said several of the men, and he opened his hand mechanically. On the upturned palm lay a black bean. He had drawn the lot.

"I say, Hawkins, you trade with me. You ain't fit to do the job," said one of the men, looking down with rough pity at the shrunken figure. But Hawkins closed his fingers over the bean with a fierce gesture, and a smoldering fire crept into his eyes. He rose slowly to his feet, and said with a firmness and steadiness of tone that surprised the others:

"I will do it myself. I hope I am man enough to not play the sneak," and then he walked out of the cave.

Out on the mountain side Hawkins wandered aimlessly until he stumbled and fell from weakness and exhaustion. He lay passive where he had fallen, and then there began a struggle that he had vainly tried to ward off by action—a struggle of which none ever knew save the silent stars and the all-seeing One above beyond them.

As he lay there scenes from the past came drifting across his memory—of the time when he was young and strong and happy; while pretty Jennie Watson was true to him. Then Dixon came, and his handsome face and fine manners, and won her away from him. In less than a year they were married, and Hawkins—well, he had grown careless, and justice had found him out. Now had come the chance for revenge on them both—a revenge that would involve their helpless children as well as themselves.

He rose stiffly, like one in a dream, and went by the shortest and most direct cut down the mountain side to the little settlement in the sheltered valley. Swiftly and skillfully he did his work. As he watched the tiny tongue of flame that had crept up the heap of kindlings he had prepared he thought of the fiery barrier that would soon cut his enemy off from escape with a fierce exultation. Then he turned and ran down the path with stumbling footsteps toward the lonely, half-ruined cabin that he called home and threw himself on his hard bed with a groan of physical weakness and pain.

Meanwhile the tiny tongue of flame crept slowly upward with soft crackling sounds; once it blazed brightly for a minute, then sank to a feeble point of blue flame, struggled weakly as if for life, and went out. A little curl of smoke wound upward and marked the place where the flame had been. Then it dissolved slowly in the clear air and nothing was left but the heap of kindling on the rude doorstep, with the few charred sticks to mark the spot where it had burned, as a silent witness of the frustrated design of the avenger.

As the first early rays of the sun peered over the mountain and sent a ray of light into the window of the cabin, Dixon swung open the heavy door and stopped on the sill in dumb astonishment at the the sight that met his eyes. Then in a moment he had grasped the truth. This was what the sly looks and unusual manner of his neighbors meant, was it? And they had failed in their cowardly work. What if they had succeeded, Jennie and the young ones would——

With an imprecation strong and deep the man turned and called his wife to his side. She came, looked where he pointed silently at their feet, and then raised her eyes to his dark face in a frightened, questioning glance. Before he could answer the unspoken inquiry he caught sight of a shambling figure coming. Something in the man's pallid face made Dixon turn to his wife and say quickly, "You'd better go inside. He wants to see me, I guess," and she obeyed silently.

Dixon kicked the debris from the step and advanced toward the advancing figure until he and Hawkins stood face to face in the narrow, worn path. The visitor looked into his face with a wavering, uncertain glance, his thin lips parted in a meaningless smile that was horrible to see, and then he began to speak in a tone in which treachery and cunning were strangely mingled.

"So Dixon was burned out last night, eh? Too bad! Wife and young ones burned? Poor Jennie! Might 'a told her, but then she would 'a warned Dixon."

The listener knew at the first word that the poor wretch before him was insane. As the hollow voice went on, betraying the whole fiendish plot to his quickened intelligence, he caught the man suddenly by the shoulders and held him with a grip that made him stop short in his rambling talk and give a little cry of pain.

"See here," cried Dixon, turning the man around in the path so that he faced toward the mountains, "you get out of here quick while I've got enough hold on myself to keep from shooting you. Go!" and he gave him a push as he released the motionless figure.

Hawkins staggered, recovered his balance and looked up into the stern face above him. Some last glimmer of reason showed him there was danger, and without a word he turned and ran with uneven steps up the little path that led to the mountains. Dixon quietly cleared away the evidences of the attempt to burn him out, forbade his wife to mention it, and bided his time. Before noon everyone in the valley knew that Dixon's cabin was still standing and that Hawkins had disappeared.

A searching party got together quietly and started out to find him. All the long, sunny afternoon they tramped and searched over the mountain side, and just as the sun sank behind the highest peak, lighting it up with an unearthly, awesome splendor, they found him. He was lying face downward, on the cool, moist ground, one arm thrown up and pillowing his forehead; in the other hand was clutched tightly a little bunch of faded mountain flowers. A dark crimson stain on the ground beneath the white face told its silent story of death.

Electricity and a Balky Horse.

A Pennsylvania gentleman owned a horse that would have been very valuable but for what seemed an ineradicable vice of balking. A friend suggested that electricity might cure him.

The gentleman purchased a small storage battery, connected it by wires to the bit and crupper, and placed it in the cart to which the horse was attached. As was anticipated, the horse refused to move, and stood with all four feet braced.

Then the owner touched the button connected with the battery. When the horse felt the shock he snorted, jumped, and began to move off at a lively pace. Every day for a week he was treated to the same lesson. As a result, his owner declares that the horse is completely cured of his evil ways.

The West Pennsylvania Humane Society, which investigated the gentleman's method, came to the conclusion that a small amount of electricity used in this way was more humane than a whip.

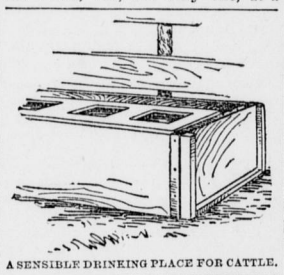
* AGRICULTURAL. *

The Quality of Eggs.

There is a much greater difference in eggs aside from their size and freshness than is generally supposed. It is very largely the result of differences in the food eaten at various seasons. In winter and early spring, when fowls begin to lay, the food is grain, and as the hen has not been exhausted by a long run of egg production, her egg is higher flavored than it is later, when the grain ration is mainly withdrawn, and a diet of insects and often of grass takes its place. On this innutritious food neither a good egg to eat nor one that will produce a strong chick can be safely depended on. One of the reasons why eggs packed in various preparations to keep them fresh are so generally unsatisfactory is that they are not first-class eggs, even when fresh. It is best to begin early in spring to put up eggs for winter. They will be better to begin with and will keep better.

A Device For Watering-Trough.

Where a number of cattle are turned out to drink together there is quite sure to be crowding and perhaps fighting at the trough. A device tending to obviate this is shown in the cut. Within the trough a board is fitted, which rises and falls as water is pumped in or is drunk out of the trough. At regular intervals are square or round openings, through which each animal can drink, one, and only one, at a



A SENSIBLE DRINKING PLACE FOR CATTLE.

place. Incidentally, the cut shows an excellent way to put watering-troughs together at the ends. Let the end pieces slightly into the sides and bottom, and "shrink on" a strap of iron, as shown. This will pull the joints together firmly, since the heated band shrinks in cooling, as does a wagon tire when placed on the wheel. Put cleats under the board that rests upon the water to keep it from warping.—New York Tribune.

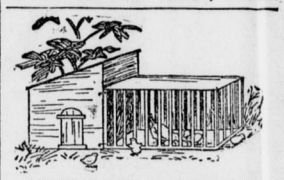
Rotating Manures in Gardens.

While the garden always receives more of the stable manure made on the farm, this is usually so deficient in mineral fertility that garden crops often suffer from lack of potash and phosphate, while the nitrogenous elements of plant food are an overabundant supply. Under such conditions the soil becomes heavy and impervious to air, or, as old farmers call it, "muck midden." Almost all garden vegetables require potash, and many of them need also phosphate to produce a successful crop. When the crop is valuable for its seed mainly these minerals are especially necessary. Beans and peas are good examples of this. It is often said they grow best on poor soil. This only means that there must be enough mineral fertility to balance that which is nitrogenous, or the vines will grow too much to leaf without either podding or filling as they should. Nitrogenous manures are not needed at all for beans, as these are never planted until the ground is well warmed, when cultivation is enough to cause the soil to furnish all the nitrogen needed. Peas are hardier, and for giving them an early start some quickly available nitrogenous manure may be used. But both potash and phosphate may be used liberally for both peas and beans, greatly increasing the yield of grain without much if any increase in the growth of haulm.

But even those crops which do not require extra large amounts of minerals are benefited by letting the garden go without stable manure one year, and substituting the same value or cost of mineral fertilizer in its stead. Even if there were no nitrogen in the concentrated fertilizer, the effect of applying potash and phosphate to land is to set free much nitrogen, and on land that has long been manured with stable manures, this amount will probably be sufficient for the year's crop. In a recent publication a well-known gardener tells how he long practiced a system of rotation in which when he had got his gardening soil overfilled with manure, relief was found by plowing under 1000 to 1500 pounds per acre of the refuse hop leaves from a brewery after their strength has been extracted. On another occasion he took the waste stems from a tobacco factory, which he found rotted in the soil, as did the hop leaves, with the result that the clammy, sticky condition of soil, resulting from over manuring with stable manure, was changed to a light loam that easily responded to any kind of manure in a single year.—American Cultivator.

An Ideal Coop For Chicks.

The usual arrangements for rearing little chicks are not, as a rule, the best that might be had. The idea seems to prevail that any old box set on edge, with a slatted front, is all that is required. In such a coop the comfort and health of the old hen is lost and she soon gets lousy and quickly transfers the lice to the chicks. This illustration shows an improvement on the old style hen coop which is at once practical, humane and inexpensive. The coop is made in the usual way, except that a door is placed in the side to remove the old hen when desired, without



A COMMON SENSE CHICKEN HOUSE.

unhooking the lath yard. A space at the top is left wide enough so that a board may be slipped down and cover the front opening to the coop to keep the hens and chicks in at night and protect them from storm and early morning dews.

The yard is made of laths or half-inch stuff, and is fastened to the sides of the coop with hooks and eyes as shown. It is secured to the ground at the farther corners by crotched sticks driven into the ground. This plan of fastening permits the use of the frame on different coops. Over the top is a square of wire netting and over this netting is stretched a length of waterproof cloth which will keep the pen dry in wet weather and shady during the hot part of the day. This cloth is fastened to buttons screwed into the frame, buttons such as are used for fastening carriage curtains being just the thing.

The arrangement permits frequent changing of both coop and pen to different locations. A portion of the ground inside the pen is spaded and the small grain fed is scattered over it to teach the chicks to scratch. Mother hen will find a corner for a dust bath and keep herself free from lice, and the entire family will be comfortable and happy. The plan is especially desirable for use with the late hatched chicks when the coop is so located that the sun shines on it during most of the day and when frequent and heavy showers come up suddenly.—Atlanta Journal.

Culture of Wheat.

At the wheat growers' convention recently held in Macon, Ga., Mr. C. H. Morrill, Bibb County, Georgia, presented a very suggestive paper on "Wheat Culture," from which we take the following: The land should be well plowed, but not too deeply, at time of sowing, and the grain worked in with a harrow and then rolled to firm the soil over the seed. When it gets well started wheat grows rapidly, but it is not a very vigorous plant and cannot fight its way as well as many of our cultivated grains. In order to make success reasonably sure it is necessary that the land should be very carefully suited to receive the seed. If the soil is very rich it is all the better. If the land has been partially exhausted an abundance of plant food must be supplied. This food must be in a condition for immediate use.

Coarse manures will do little good. Stable manure and green cotton seed is not plant good and will decay and can be assimilated. The wheat plant is a delicate feeder and its food must be carefully prepared. Wheat may follow a pea crop if the land is rich enough otherwise, as the pea crop furnishes nitrogen stored in its roots which the wheat crop must have. In this case, however, some chemical fertilizers should be used. In any and every case the land should be made rich and the plant food which it contains must be near the surface. In this section I should prefer chemical manures to any other form of fertilizers and should apply it heavy. As the wheat crop, including the grain, straw and chaff, takes from the soil twenty-four pounds of phosphoric acid, fifty-nine pounds nitrogen, thirty-one pounds potash, we must apply these elements of plant food to the soil in the shape of nitrate of soda at the rate of 150 pounds to the acre, half at time of sowing, the other half as a top-dressing in the spring, and 500 pounds of a fertilizer containing nine per cent. of phosphoric acid and twelve per cent. of potash.

Too much stress can hardly be laid upon a thorough preparation of the soil. Under the common system of management all that can be done towards making the crop is finished when the sowing is performed. Wheat is a peculiar plant and requires four peculiar conditions of soil and care. As in its fruit it is superior to all other grains, so in its habits it is more particular and exacting than others. It cannot endure conditions in which corn or oats would flourish. It requires a rich, clean soil and should follow a crop that has been cleanly cultivated and all weed seeds eradicated from the land. The wheat growers of the West have followed the same land killing process that the cotton farmers of the South have followed, every successive crop diminishes the supply of organic matter, and from the careless culture every successive year increases the stock of weeds. If wheat could receive the very best system of culture so that the ground should be mechanically in a proper condition and weeds be kept out, good crops of wheat could be grown much longer without manuring the soil, by proper cultivation simply. The experiments of Mr. Lowes, of England, seem to indicate this. He raised twenty-seven successive crops of wheat from one plant of land without any manure. The crop of 1844 was fifteen bushels per acre, and that of 1870 exactly fifteen bushels, this amount also being the average yield during the entire time. It should be understood that the ground was kept free from weeds, the wheat being in drills and the soil cultivated between them.—Farm, Field and Fireside.

There are millions of the inhabitants of the Philippine Islands who never knew the dominion of Spain and never saw a Spaniard.

GOOD ROADS NOTES.

Illinois Roads.

There's a blight upon your name,
Illinois, Illinois,
It has compromised your fame,
Illinois, Illinois;
In the spring and in the fall,
When there's lots of things to haul,
We can't use your roads at all,
Illinois, Illinois;
We can't use your roads at all,
Illinois.

When it comes to raising corn,
Illinois, Illinois;
You can laugh them all to scorn,
Illinois, Illinois;
But it's painful to relate
That for highways out of date
You're the banner-holding State,
Illinois, Illinois;
You're the banner-holding State,
Illinois.

See them stretching on and on,
Illinois, Illinois;
Like a ditch across the lawn,
Illinois, Illinois;
Full of mud so black and thick
That a four-in-hand would stick
With a load of twenty brick,
Illinois, Illinois;
With a load of twenty brick,
Illinois.

Shake the moss from off your back,
Illinois, Illinois;
Time to take another tack,
Illinois, Illinois;
If you have a bit of pride,
Don't be any longer guyed—
Make your mud-roads hard and wide
Illinois, Illinois,
Make your mud-roads hard and wide,
Illinois.
—Illinois State Journal.

Advantages of Improved Roads.

One of the most interesting papers read at the New York State Farmers' Congress, recently held at Albany, N. Y., was that on the "Advantages of Improved Highways," by John A. C. Wright, of Rochester, N. Y. In part Mr. Wright said: "No subjects are so closely related as highways and agriculture. Material prosperity depends upon production and transportation. In production we have made immense strides, in manufactures many-fold, and even on the farm each of us produces as much as all four of his forefathers of two generations ago. Besides the cost of production there is the cost of getting what is produced to its best market. How much that is, we often fail to realize. It has been computed that the annual freight bill of each of us is $60. This is the transportation charge or what it costs us to move products over the highways which are of three sorts—the common highway, the railway and the waterway. The relative cost is most aptly shown by stating that the amount it costs to move a ton five miles on the highway, will move it twenty-five miles on the electric railway, 250 miles on the steam railway and 1250 miles in deep waterways.

"In improving, therefore, the common highway, we reduce the largest item in this freight tax. By painstaking effort we have found it costs thirty cents per ton mile on the ordinary road, such as we have, and a smooth hard road-way would reduce this to seven cents per ton mile, or we would do the business for one-quarter of what it costs us now. This is equivalent by the above tables to getting each ton carried for more than 500 miles by rail and more than 1000 miles by water.

"We have also found that the farm products of this State reduced to tons are about 12,000,000 tons, and that at the average haul costs about $1.50 to move per ton, or a freight bill for primary transportation of agricultural products of $18,000,000 a year. If we had good roads this cost would be, to allow a good margin, less than $6,000,000 and the saving over $12,000,000 a year, or as much as our total State tax bill for all purposes. The common road, therefore, is the most important factor in transportation, so far as we are concerned, and the chance for saving in haul on it the greatest."

Hampered Farmers.

"To-day the barriers between us and the remainder of the county are roads that are almost impassable," says the Waukegan (Ill.) Gazette. "In this the town is not alone the sufferer. Farmers throughout the county are hampered and their work seriously retarded because of miserable highways. Would it not be wise to labor through our representatives for the passage of a bill calculated to remedy this evil?"

Coxey Quits the Road.

General Coxey, whose plan for the betterment of highways was not adopted by Congress, declares roads at Massillon, Ohio, are impassable. He has purchased a naphtha launch, and will hereafter do his traveling on the canal. Coxey's office is five miles from his residence, the road being the worst in the county.

The Warfare in Brief.

Every added inch of mud makes the road many miles longer.

The farmer who is mired in the mud up to his knees should be deeply interested in roads.

The improvement of a road should depend upon something more than the wind and the sun.

The best method in which a town can pave its way to success is to pave its streets and improve the highways leading therefrom.

Wide tires are growing in favor. Now that some of the States are building expensive highways, tax-payers insist that the roads shall be preserved.

The San Francisco Bulletin points out that the county which cannot afford schools and good roads is allowed to pass into the possession of men who want neither.

Hempfield Township, Westmoreland County, Penn., must pay $310 to a citizen who was crossing a bridge with a threshing-machine when the bridge gave way and dumped the outfit into a creek. Poor highways are expensive.

POPULAR SCIENCE.

A scientist of some standing, according to the Mining and Scientific Press, asserts that chemically pure water is poison to the human stomach, upsetting some hitherto accepted theories regarding distilled water by the argument that in distillation the water losses sundry salts that it greedily abstracts from the animal tissues when it is swallowed, thus constituting a protoplasmic poison. If this view be sustained, "absolutely pure water" is more dangerous than ordinary water impregnated with impurities absorbed from the atmosphere or collected in its flow.

Professor Torvald Kohl, of the Odder Observatory, Denmark, reports that when the huge sunspot of September last was crossing the solar meridian, magnificent auroral lights flashed across the heavens, and the electric bells in the great telegraph station at Fredericia rang without any visible cause. The telegraphic service in Denmark was disturbed for hours during the auroral display. Professor Kohl thinks that the agency of the sun in producing the phenomena was evident. Similar exhibitions of "wireless telegraphy" between the sun and the earth have been noted in the past.

A new form of spectroscope has recently been devised by Lord Rayleigh in which simplicity of construction is combined with high dispersive power. In the new instrument ten right angled prisms are arranged side by side in a long tube which is filled with a mixture of bisulphide of carbon and benzol in such proportions as to give the same index of refraction as glass. The advantages claimed for the instrument are that it gets rid of the loss of light by reflection, and minimizes the effect of the irregularities in the glass, while the light undergoes no refraction for that portion of the spectrum for which the adjustment is made. On the other hand, the arrangement is greatly affected by temperature, as the refraction indices of the substances vary with any change. Professor Rayleigh was, however, able to use the apparatus to show on the screen the separation of the sodium line.

More puzzling to the astronomers than the canals of Mars is the singular doubling of some of these, or their appearance in pairs, which appear to be variable to different observers. An accidental observation is brought forward by Dr. A. Woolsey Blacklock to show that astigmatism may explain the phenomena of doubling. His eyes are affected with astigmatism, the direction in one eye being at right angles with that in the other, and on glancing at some trees with one eye he recently noticed that all the twigs slanting upward to the left appeared double, while those sloping the other way were single. The double twigs were like the two images seen through a block of Iceland spar, one being rather fainter than the other. On changing the position of the head the double twigs became single and the single ones double, a variation corresponding with what is seen in certain canals of Mars on different nights when the planet occupies different positions.

Alexander A. Lawes, civil engineer, of Sydney, Australia, suggests a plan of mechanical flight on beating wings as presenting advantages that transcend all other schemes. He believes that the amount of power required to operate wings and the difficulty in applying it are exaggerated beyond all measure. The wings or sustainers of the bird in flight, he urges, are held in the outstretched position without any exertion on its part; and many birds, like the albatross, sustain themselves for days at a stretch. "This constitutes its aerial support, and is analogous to the support derived by other animals from land and water." The sole work done by the bird is propulsion and elevation by the beating action of the wings. Mr. Adams's machine, which he does not say he has tried, is built in conformity to this principle, and its sails are modeled as nearly as possible in form and as to action with those of the bird. The aid of an air cylinder is further called in, through which a pressure is exerted balancing the wings. The wings are moved by treadles, and the author's picture of the aeronaut looks like a man riding an aeriel bicycle.

A Very Eccentric Man.

There is a queer man in Washington who makes it a business to attend receptions, teas, weddings and other social gatherings to which he has not been invited. He always pays his respects to the hostess, speaks a few polite words and than passes into the crowd. He is never offensive, but always deferential, and is simply tolerated because that is the easiest way to get along with him. He lives quietly with his mother and sister in a well-situated and well-appointed house in the west end, but the ladies of the family have never made any attempt to enter society. Their eccentric brother confines his social enjoyment to these intrusions, which are harmless and are so well known as to cause little remark. Some ladies have instructed their butlers not to admit him. When he is refused entrance at a house he always retires in a gentlemanly manner, handing his card, with a request that his regrets be offered to the lady of the house. He seems to think that it is his duty to go to these places, and he does it in a conscientious manner.—Chicago Record.

Life of a Car Wheel.

The car wheels made in Pennsylvania are generally run 40,000 miles on passenger coaches and are then put on freight cars. A forty-two-inch wheel now in the shops has been run over 700,000 miles and a thirty-six-inch wheel has traveled 600,000 miles.